National Institute of Environmental Health Sciences

Modeling the impact of climate variability on diarrhea-associated diseases in Taiwan (1996-2007)

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Abstract:

Diarrhea is an important public health problem in Taiwan. Climatic changes and an increase in extreme weather events (extreme heat, drought or rainfalls) have been strongly linked to the incidence of diarrhea-associated disease. This study investigated and quantified the relationship between climate variations and diarrhea-associated morbidity in subtropical Taiwan. Specifically, this study analyzed the local climatic variables and the number of diarrhea-associated infection cases from 1996 to 2007. This study applied a climate variation-guided Poisson regression model to predict the dynamics of diarrhea-associated morbidity. The proposed model allows for climate factors (relative humidity, maximum temperature and the numbers of extreme rainfall), autoregression, long-term trends and seasonality, and a lag-time effect. Results indicated that the maximum temperature and extreme rainfall days were strongly related to diarrhea-associated morbidity. The impact of maximum temperature on diarrhea-associated morbidity appeared primarily among children (0-14years) and older adults (40-64years), and had less of an effect on adults (15-39years). Otherwise, relative humidity and extreme rainfall days significantly contributed to the diarrhea-associated morbidity in adult. This suggested that children and older adults were the most susceptible to diarrhea-associated morbidity caused by climatic variation. Because climatic variation contributed to diarrhea morbidity in Taiwan, it is necessary to develop an early warning system based on the climatic variation information for disease control management.

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Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Policymaker

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other

elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Meteorological Factors, Temperature

Extreme Weather Event: Drought, Flooding

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Other Geographical Feature

Other Geographical Feature : Subtropical

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Taiwan

Foodborne/Waterborne Disease: Other Diarrheal Disease

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Children, Elderly

Resource Type:

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content